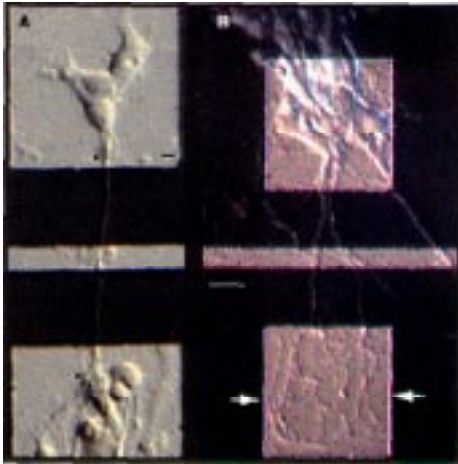# A Hybrid Neuron-Silicon Computational System for Pattern Recognition
University of Southern California/Theodore Berger

Objective

Develop a novel, hybrid neuron-silicon technology that will harness the computational capacity of cultured networks of hippocampal neurons for temporal and spatio-temporal pattern recognition applications.

Approach

- Interface novel electrode arrays with hippocampal tissue slices & neuron cultures

- Develop growth techniques for cortical neurons on silicon substrates

- Develop neurobiologically-based pattern recognition systems

- Develop technologies to interface silicon-based computer systems and neurobiological systems

- Develop temporal dynamic hardware architecture

Schedule

- Silicon-based "conformal" multi-site electrodes for hippocampal slice cultures
- Unidirectional, convergence controlled-growth conditions for dissociated neuron cultures
- Hardware/software for optimizing tissue registration with the electrode arrays
- Signal processing paradigms for tissue-based feature extraction
- Analog VLSI implementation of dynamic synapse neural network for pattern recognition